

BRIEFER ARTICLES.

ZIZIA AUREA AND THASPIUM AUREUM.

For the past two seasons special observations have been made upon these plants. Combined with those of previous years they furnish a fair outline of the habits and character of the two as they are found in those parts of Illinois and Indiana contiguous to Chicago. A large number of specimens were critically examined and compared and abundance of field notes made. Although the two plants have frequently been confounded by collectors, I find few plants so nearly allied that are better distinguished specifically, and a little practice enables one to tell them from the time the radical leaves attain a fair size in the spring.

The beginning and duration of the flowering season of the two plants differ, and still more those of the fruiting season. The ordinary season of anthesis of *Z. aurea* in this region is from the middle of May to the middle of June, while that of *T. aureum* is from the first of June up to near the middle of July, usually lasting two or three weeks longer than in the case of *Z. aurea*. The remarkably early spring of 1896, due to the summer heat of April, brought both plants forward considerably earlier, and the terminal umbel of the stem of *Z. aurea* was beginning to bloom by April 30. By the 12th of May the plants were in full flower. At the latter date all examples of *T. aureum* that were found were in bud. When next examined on the 23d of May they had come into flower, but the anthesis was principally confined to the first umbel. The fruit of *Z. aurea* begins to ripen during the first half of July, and by the last of August has about all fallen from the dead stems of the plant. I have found it clinging to the carpophore as late as September 7, but the connection was so fragile that the slightest disturbance dislodged it. The mericarps of *T. aureum* are well advanced by the first of August, and in an early season like the last some will be ripe by the last of the month, but the ordinary time of ripening is September, and nearly all of the carpels are found adher-

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ing to the rays of the umbellets then. I have found the carpels still adhering to each other as late as October 19. While the two plants differ by about two weeks in beginning their anthesis, they differ from four to six weeks in the time needed to mature their fruit. The fruit of *T. aureum* not only matures more slowly, but also adheres more firmly to the carpophores, and requires a greater force to detach it.

This later ripening and firmer attachment of the fruit evidently has a bearing on the distribution of the plants. The *Zizia* is seen scattered about over wide spaces in localities where it grows, while the *Thaspium* is apt to occur in patches or colonies. The fruit of the former is readily torn off by any slight jar given by passing animals or by the wind, and is by these means often thrown quite a distance around. The fruit ripens and the stalks die before the appearance of frost. The fruit of the *Thaspium* usually falls to the ground with the ripened stalk, or this may be cut down by an early frost. Its firmer attachment tends to keep it nearer by when dislodged. The seed is from these circumstances left near the parent stock, and from its mode of distribution helps to keep the plants in patches. Owing to the longer life of the plant the fruit as well as the stem and leaves frequently become purple in late summer, and quite generally so late in the season at the time of frost.

There is quite a difference in the general appearance of the two plants. The leaves of *T. aureum* are of a lighter shade of green; their texture, even when thin, rather firmer than in *Z. aurea*, and the network with larger and more open meshes. They are bordered by a white hyaline line, which often becomes prominent, especially in the lower leaves. In *Z. aurea* the network is very fine, the meshes small, the hyaline line very narrow, the whiteness often limited to the tops of the serratures, which are sharp in most cases and callous tipped. Familiarity with this leaf structure enables one to tell the plants in nearly all stages of growth, as they are quite constant. The flowers of *Z. aurea* are golden yellow, as its specific name indicates; those of *T. aureum* are paler, inclined to a lemon-yellow. The rays in the umbels of the latter contract much more on their inner side than those of the former, so that they bend inward and bring the carpels more into a bunch, and make the diameter of the fruiting umbel considerably less than that of the umbel when in flower.

Two forms of *Z. aurea* may be noted: (a) A wood form, grow-

ing in the woods or shady places. It is commonly the taller of the two, from three to five feet high, the radical leaves on petioles twelve to twenty inches long, the leaflets large, the terminal 2-4 inches long by $1\frac{1}{2}$ -3 inches wide. The leaflets are very sharply, often doubly serrate, or somewhat serrate-lobed. (b) A prairie or meadow form. This is usually seen in fields or in the thinly wooded sections of the sand dune region. It is a smaller plant, from eighteen inches to three feet high, the radical leaves on petioles a foot or less in length. The leaves are tinged with yellow, generally simply serrate, or the lower stem and radical leaves serrate-crenate. The fruit is essentially the same in both forms, though the carpels in (b) are apt to be broader than deep, a cross section approaching a circular form less nearly than in (a). The plants resemble *Z. cordata* more than those of the woods form, but I have not found any with cordate leaves, nor detected *Z. cordata* in our local flora.

The examples of *T. aureum* which I have seen here do not conform either to the type or to the variety *trifoliatum*. Though inclining to the variety it would be quite futile to try to draw a line of separation. The radical leaves, whether round-cordate and entire, or divided, are crenate or crenate-serrate. The cauline leaves change gradually along the stem from the basal with crenate-serrate margins to those which are serrate, the uppermost frequently quite sharply serrate. Plants with the radical leaves simple and cordate are common, but grow promiscuously with those having the radical leaves trifoliate, or both forms of radical leaves spring from the same root. A suite of radical leaves in various stages of development from the cordate to the trifoliate, or even pinnate, can easily be collected. Some are two lobed, cleft or divided, others three lobed, cleft or divided, or variously changing into subpinnate or pinnate forms. Cordate leaves are rarely absent from a group of plants. If not attached to the stem-root, a little searching reveals them as the leaves of seedlings close at hand. These are generally entire, but some have the lobation commenced. Dividing is, however, infrequent until the root is old enough to bear a leafy stem.

Sometimes the ribs of *Z. aurea* are expanded so as to make a narrow wing, and it is hardly proper to call the fruit in all cases apterous. But other characters so plainly distinguish it from *T. aureum* that the two are readily separated specifically, even if they were to be united generically. Though the terminal fruit in the

umbellets of the two plants is frequently aborted, when present I have found no exception to its sessile character in *Zizia* and stalked in *Thaspium*.

As far as I have met with the two plants in this region they differ in their habitats. *Z. aurea* is very abundant, and occurs throughout in suitable localities, and grows indifferently in clayey and in sandy soils, but more vigorously in the former. *T. aureum* is infrequent, and has always been found in clayey or loamy land, and almost always along streams. I have but one specimen away from streams or the vicinity of water, from Forest Hill, in the south part of the city. Its principal home is along the bluff banks of streams, or beyond the bounds of the flood plain. From these banks, either contiguous to the stream or bordering the flood plain, it spreads a little into the adjacent woods. In such situations I have seen it by the Kankakee river, the Desplaines and some of its branches, the Calumet, and Thorn creek, one of its affluents, and it is likely to occur under similar conditions along other streams of the vicinity.—E. J. HILL, *Chicago*.

A NEW ISOETES FROM IDAHO.

Isoetes Underwoodi, n. sp.—Leaves 18–50, rather slender, 10–16^{cm} long, erect to recurved, semi-lunate or nearly helmet shaped in section, striate, with abundant stomata above; peripheral bast bundles generally all four present, but sometimes one or more lacking: macrosporangia dark brown: microsporangia olivaceous, elliptic to narrowly oblong, much pitted, 6–8^{mm} long, slightly covered by the narrow wings of the velum: ligule rather narrowly triangular: macrospores *bright white*, 0.33–0.45^{mm} thick, rough with low single or confluent tubercles: microspores 0.025–0.028^{mm} long, unsymmetrical, short spinulose on the edges.

Wet ground, borders of pools, Paradise creek, in and near Moscow, Idaho.

This plant is submerged during a greater part of the spring, but seems to reach perfection entirely out of water. The dry leaves look more or less round, but this is due to the sharp lateral edges becoming so involute as to present merely a narrow channel along the widest side. The air cavities are generally quite large and the walls thin. It differs much from the only other two species of this region, *I. Nuttallii* and *I. Bolanderi*. From the first it differs in its longer